Appln. No. 10/807,088   Attorney Docket No. 10543-069

I.   **Amendments to the Claims**

1.   (Currently amended) A system for estimating body states of a vehicle comprising:

a first set of at least two sensors mounted to the vehicle, the first set of sensors ~~generate~~ generating measured vehicle state signals corresponding to ~~dynamics~~ the acceleration of the vehicle in a first direction;

a second set of at least two sensors mounted to the vehicle, the second set of sensors generating measures state signals corresponding to the acceleration of the vehicle in a second direction;

a signal adjuster which transforms the measured vehicle states signals from a sensor coordinate system to a body coordinate system associated with the vehicle; and

a filter which receives the transformed measured signals from the signal adjuster and processes the measured signals into body state estimates of the vehicle.

2.   (Original) The system of claim 1 wherein the filter includes a model of the vehicle dynamics and a model of the sensors, the state estimates being based on the transformed measured signals and the models of the vehicle dynamics and sensors.

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3.   (Currently amended) The system of claim [[3]] 1 wherein the filter includes an estimator, an algorithm being implemented in the estimator to process the transformed measured signals and the models of the vehicle dynamics and sensors and generate the state estimates.

4.   (Original) The system of claim 1 wherein the sensors are linear accelerometers.

5.   (Original) The system of claim 1 wherein one of the se sors is an angular rate sensor.

6.   (Cancelled)

7.   (Currently amended) The system of claim [[6]] 1 wherein the sensors further include two accelerometers that measure accelerations in a third direction.

8.   (Cancelled)

9.   (Currently amended) The system of claim [[8]] 1 wherein the sensors include two accelerometers that measure the vertical acce erations of the vehicle.

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10.   (Original) The system of claim 1 wherein the state estimates relate to the vehicle's lateral velocity, yaw rate, roll angle, and roll rate.

11.   (Original) The system of claim 1 wherein the signal adjuster further provides compensation for gravity biases associated with the sensors.

12.   (Currently amended) A method for estimating body states of a vehicle comprising:

generating measured vehicle state signals corresponding to <u>the acceleration</u> ~~dynamics~~ of the vehicle <u>in a first direction</u> with <u>a first set of</u> at least two sensors;

<u>generating measures vehicle state signals corresponding to the acceleration of the vehicle in a second direction with a second set of at least two sensors;</u>

transforming the measured vehicle states signals from a sensor coordinate system to a body coordinate system associated with the vehicle; and

processing the measured signals into body state estimates of the vehicle.

13.   (Original) The method of claim 12 system of claim 1 wherein the processing includes modeling the vehicle dynamics and the sensors.

14.   (Cancelled)

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15.   (Cancelled)

16.   (Original) The method of claim 12 wherein the state estimates relate to the vehicle's lateral velocity, yaw rate, roll angle, and roll rate.

17.   (Original) The method of claim 12 wherein the transforming includes providing compensation for gravity biases associated with the sensors.